Name:_____ Euler Cycle Activities Date:_____

Activity #1: Airline Routes:

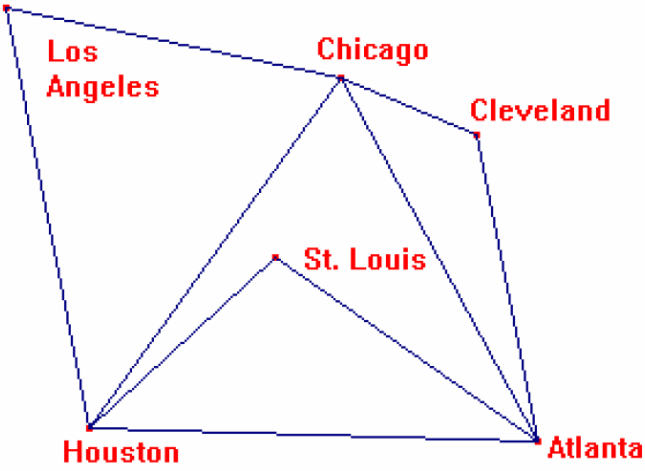


Figure 1

1. List the vertices of figure 1

_____
_____
_____

2. List the other edges in figure 1.

_____
_____
_____

3. How many chains can you find from Los Angeles to Cleveland? List them below.

_____
_____
_____

4. How many other cycles can you find beginning and ending in Cleveland with at most 4 stops? List them below.

_____
_____
_____

Activity #2: Degrees and Euler Cycles:

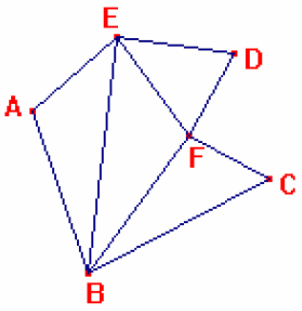


Figure 2

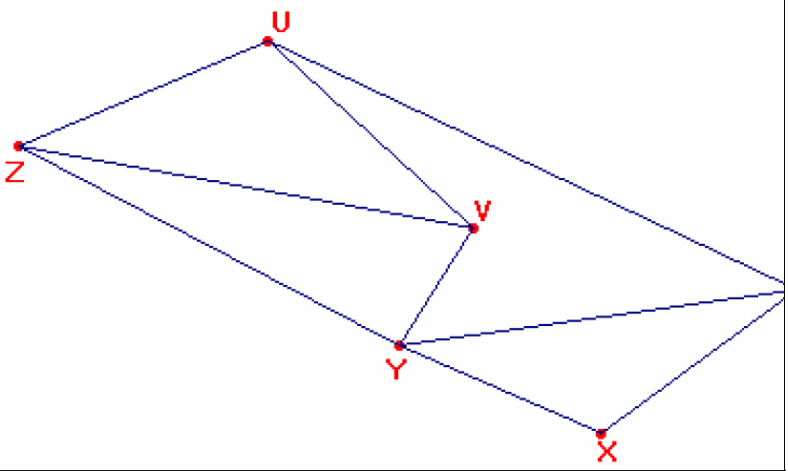


Figure 3

1. The ***degree*** of a vertex in a graph is the number of edges meeting at that vertex. Label the degrees of each vertex in figures 2 and 3 beside each.

2. An ***Euler cycle*** is begins and ends at the same vertex and covers every edge only once passing through every vertex. Refer back to Activity #1: Airline Routes. Can you trace an Euler cycle in figure 1 beginning and ending in Los Angeles? If so, describe (name) your path below.

_____

_____

_____

3. Does figure 2 have an Euler cycle beginning and ending at D? Do the vertices in figure 2 have even or odd degrees?

_____

_____

4. Does figure 3 have an Euler cycle beginning and ending at V? Do the vertices in figure 3 have even or odd degrees?

_____

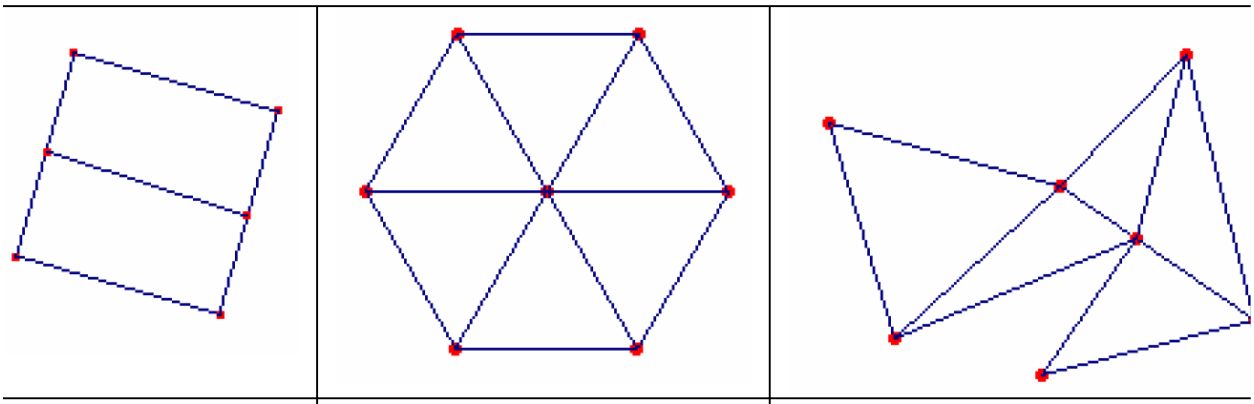
_____

5. Based on your answers in questions 3 and 4, what property can you conjecture about a graph that has an Euler cycle?

_____
_____
_____

Activity #3 – Eulerization of a Cycle:

our changes on the figures below.



Graph A	Graph B	Graph C

1. Refer to the three graphs above. Can you Eulerize these cycles? Draw your changes on the figures below.

2. Can you generalize a method for Eulerizing a given graph? Explain your reasoning.

_____
_____
_____

3. If the mayor of a city is designing a route for snowplows, why would the process of Eulerization be particularly useful?

_____
_____
_____

Activity #4 – Finding Euler Chains and Cycles

For each of the following

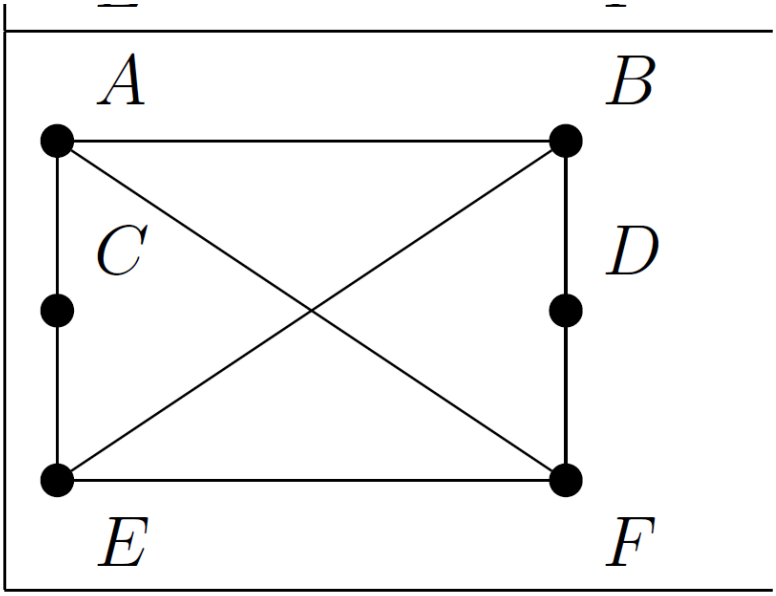
a) state the degree at each vertex
b) If an Euler chain exists and if it does, describe (name) one
c) If an Euler cycle exists and if it does, describe (name) one

1.

a) d(A) =
d(B) =
d(C) =
d(D) =
d(E) =
d(F) =

b)

c)

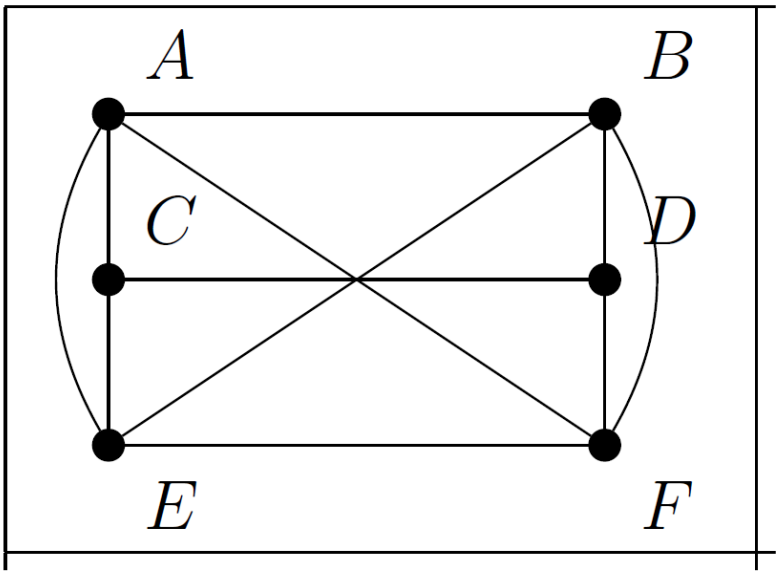


2.

a) d(A) =
d(B) =
d(C) =
d(D) =
d(E) =
d(F) =

b)

c)



3.

b) d(A) =
d(B) =
d(C) =
d(D) =
d(E) =
d(F) =

b)

c)